What is claimed is:

1. A sensor element for determining the concentration of gas components in gas mixtures, in particular for determining the oxygen concentration in exhaust gases of internal combustion engines, comprising at least one pump cell which pumps oxygen into or out of a measuring gas chamber, as well as at least one concentration cell which has at least one reference electrode essentially arranged in a reference gas channel, the reference electrode interacting with a measuring electrode, the measuring gas chamber and the reference gas channel essentially being situated in the same layer plane, and the reference gas channel allowing contact with a reference gas atmosphere,

wherein a partition (12), whose base is a ceramic paste applied to an adjacent, solid electrolyte foil, is arranged between the measuring gas chamber (13) and the reference gas channel (15).

2. The sensor element as recited in Claim 1, wherein the geometry of the partition (12) is largely adapted to the reference-gas-side boundary of the measuring electrode (21) situated in the measuring gas chamber (13).

3. The sensor element as recited in Claim 1 and 2, wherein the measuring electrode (21) has an annular design and is largely formed in the measuring gas chamber (13); and the partition (12) constitutes a segment of a circular ring.

4. The sensor element as recited in at least one of Claims 1 through 3, wherein the reference electrode (22) has a boundary on the side of the measuring gas chamber, the boundary being largely adapted to the shape of the partition (12)

boundary on the side of the reference gas.

5. The sensor element as recited in at least one of the preceding claims,
wherein the surface of the reference electrode (22) is tapered in its dimensions, from the end (16) of the reference gas channel (15) on the side of the measuring gas chamber, in the direction of the end (18) of the reference gas channel on the side of the gas intake, in such a manner, that the center of mass of the electrode surface approaches the center point of the measuring electrode (21) as closely as possible.

6. The sensor element as recited in at least one of the preceding claims,
wherein at least a section of the reference gas channel (15) and/or of the reference electrode (22) is at least partially led around the measuring gas chamber (13).

7. The sensor element as recited in at least one of the preceding claims,
wherein an inner pump electrode (20) of the pump cell is arranged in the measuring gas chamber (13), oppositely to the measuring electrode (21).

8. The sensor element as recited in at least one of Claims 1 through 6,
wherein the measuring electrode (21) situated in the measuring gas chamber (13) simultaneously forms an inner pump electrode (20) of the pump cell.

9. The sensor element as recited in at least one of the preceding claims,
wherein the measuring gas chamber (13) has at least one opening (25) on the large surface of the sensor element facing the gas mixture, the opening being essentially normal to the upper surface of the sensor element, and

allowing the gas mixture to enter into the measuring gas chamber (13).

10. The sensor element as recited in at least one of the preceding claims,
wherein the measuring gas chamber (13) is designed to be circular, and the center point of the circle lies on the center line of the opening (25).

11. The sensor element as recited in Claim 10,
wherein the measuring electrode (21) and the inner pump electrode (20) are designed to be annular, and a diffusion barrier (27), which is annular as well, is arranged in front of them, in the diffusion direction of the gas mixture.

12. The sensor element as recited in one of the preceding claims,
wherein the reference electrode (22) is situated on the side of the reference gas channel (15) that points in the direction of the large surface of the sensor element exposed to the gas mixture atmosphere.

13. The sensor element as recited in at least one of the preceding claims,
wherein two diametrically opposed reference electrodes (22, 24) are situated in the reference gas channel (15).

14. The sensor element as recited in at least one of the preceding claims,
wherein a part of the measuring electrode (21) is situated outside of the measuring gas chamber (13).

15. The sensor element as recited in at least one of the preceding claims,
wherein a part of at least one of the reference electrodes (22, 24) is situated outside of the reference

gas channel (15).

16. The sensor element as recited in at least one of the preceding claims,
wherein the reference gas channel (15) is at least partially filled in with a porous ceramic material, which preferably corresponds to that of the diffusion barrier (27).

17. The sensor element as recited in at least one of the preceding claims,
wherein a first, solid electrolyte foil (11a) exposed to the gas mixture atmosphere, and a solid electrolyte layer (11b) containing the measuring and reference gas channels, are provided, and the solid electrolyte layer (11b) is directly deposited on the solid electrolyte foil (11a).

18. The sensor element as recited in Claim 17,
wherein the solid electrolyte layer (11b) is connected to a second, solid electrolyte foil (11c), and this is connected to an additional, solid electrolyte foil (11d); and a heating element (40) is introduced between the second and the additional, solid electrolyte foils; and the layer thickness of the additional, solid electrolyte foil (11d) is dimensioned in such a manner, that the heating element (40) is essentially equidistant from the two large surfaces of the sensor element (10).

19. A method for manufacturing a sensor element as recited in at least one of Claims 1 through 18,
wherein a solid electrolyte layer (11b) is applied to a solid electrolyte foil (11a) by screen-printing a pasty ceramic material, the solid electrolyte layer (11b) containing the measuring gas chamber (13) and the reference gas channel (15).

20. The method as recited in Claim 19, wherein a boundary for the measuring gas chamber (13) and the reference gas channel (15) is produced by the solid electrolyte layer (11b).

21. The method as recited in Claims 19 and 20, wherein at least one supporting element (28) is produced in the reference gas channel (15), using the solid electrolyte layer (11b).

22. The method as recited in Claims 19 through 21, wherein the pasty ceramic material contains the same solid electrolyte as the solid electrolyte foil (11a).

23. The method as recited in Claims 19 through 22, wherein a thermal treatment, by means of which the pasty ceramic material is converted into a ceramic form, is carried out after the printing procedure.

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